Software Development

- LAPS Workshop Oct 25-27, 2010
- More info (including Forum) at:

  http://laps.noaa.gov

LAPS README

This LAPS/STMAS README file is viewable on the WWW via the LAPS home page

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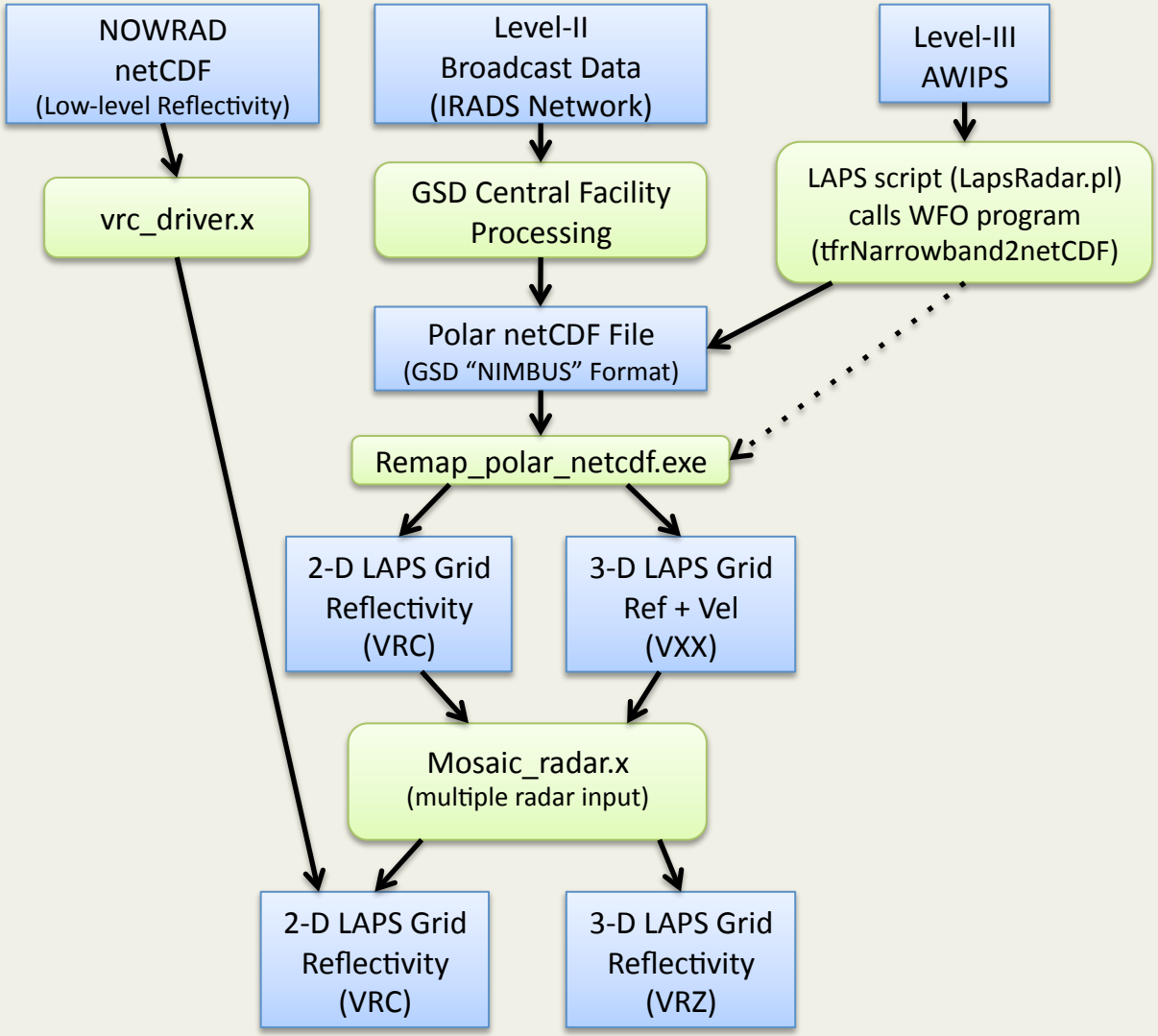
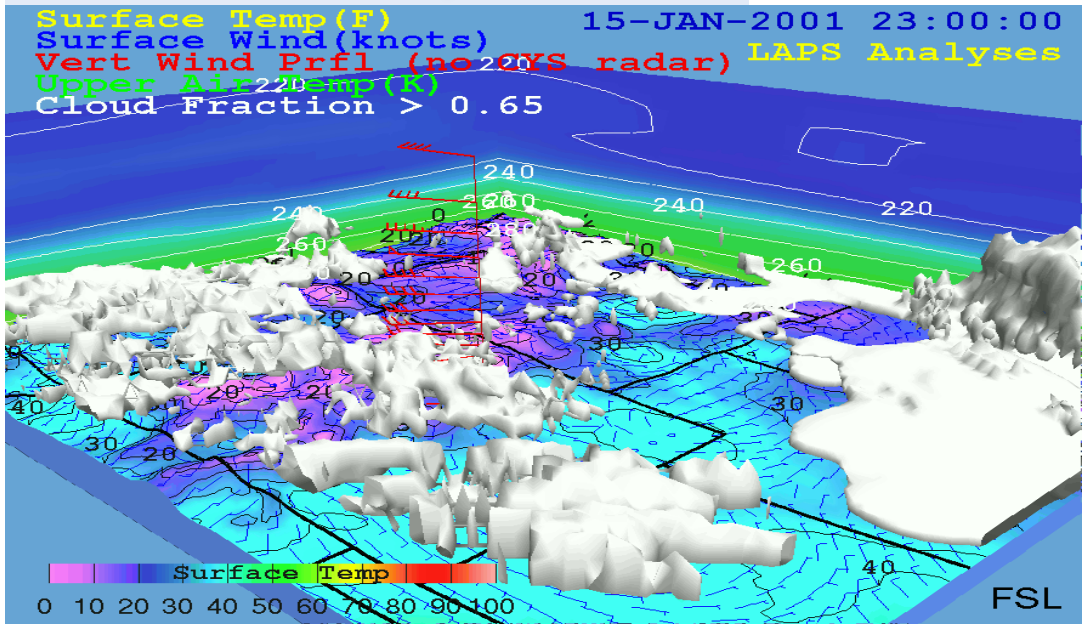
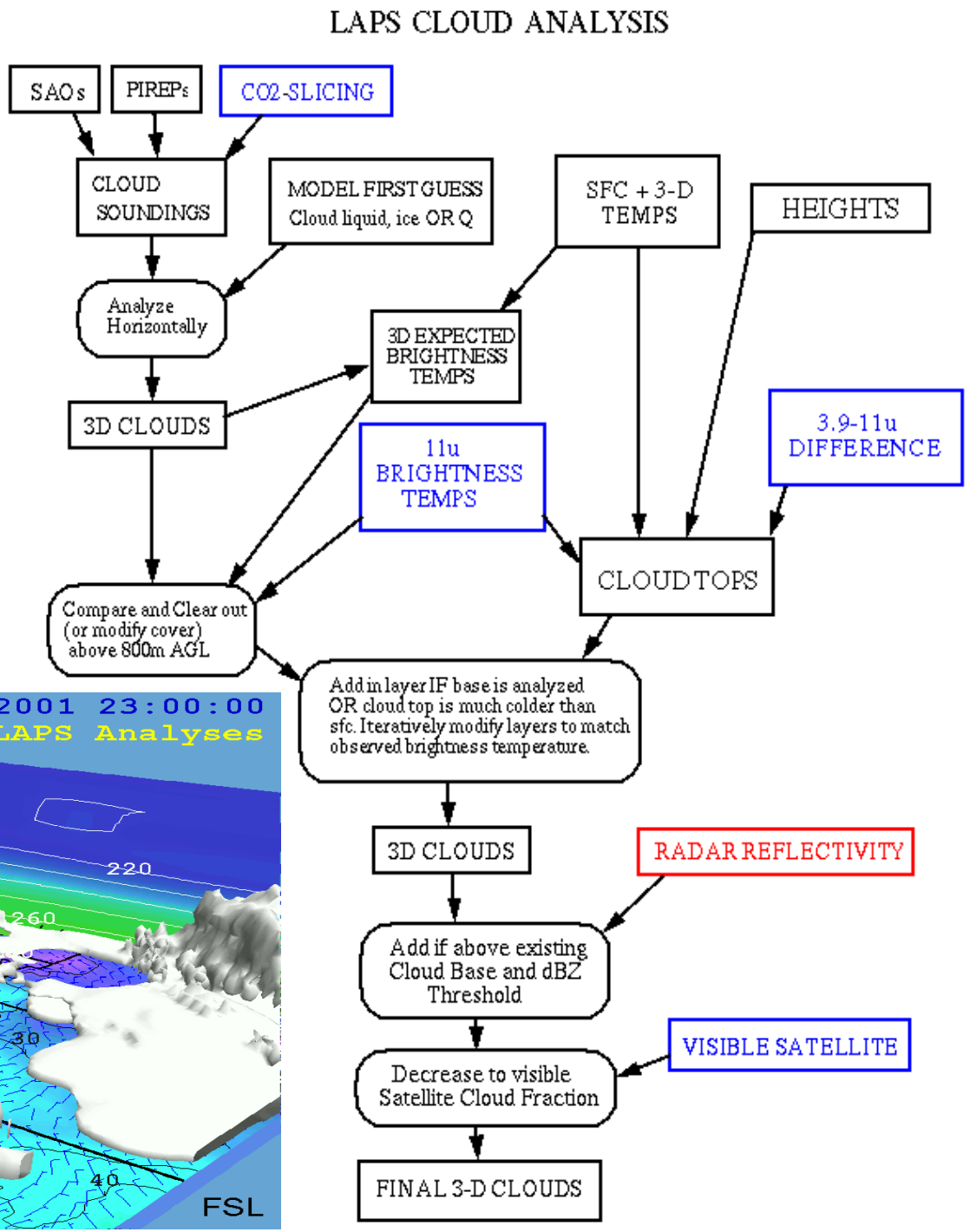
LAPS Radar Ingest



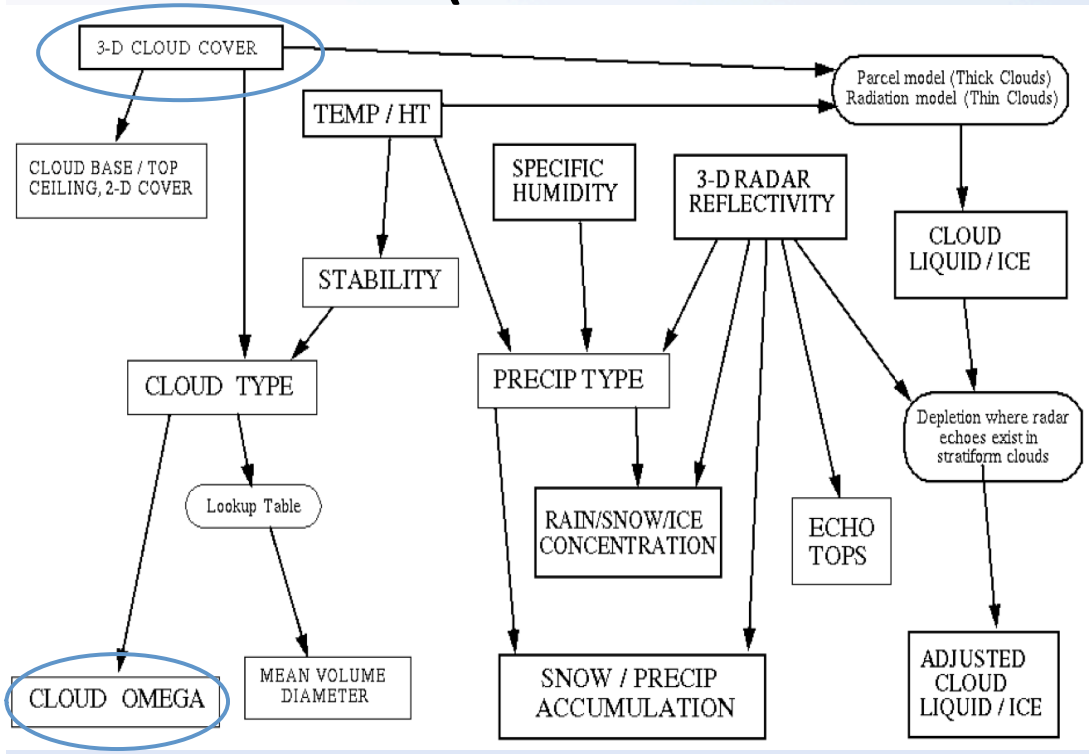
Cloud Analysis (cloud.exe) Flow Chart

Cloud Fraction 3-D Isosurface

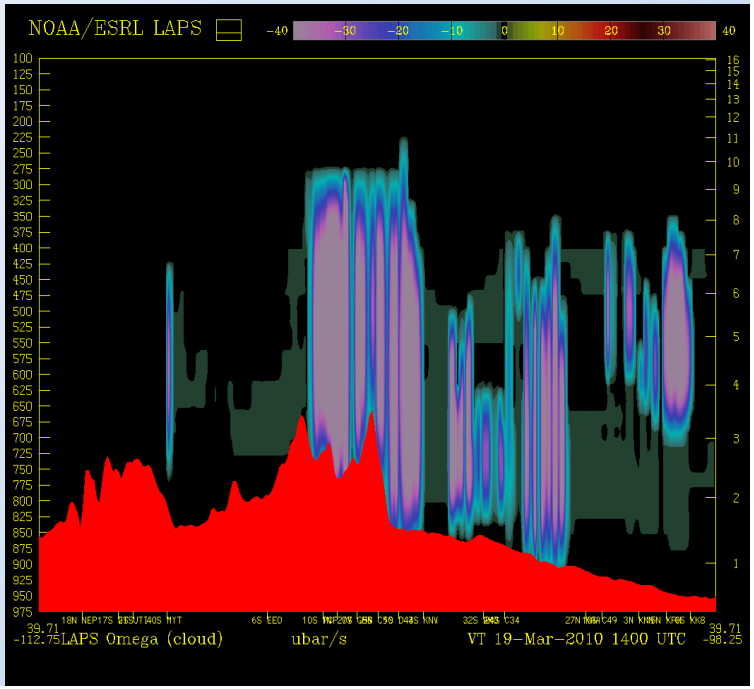




Microphysics, Vertical Motion and Hot-Start (deriv.exe + accum.exe)

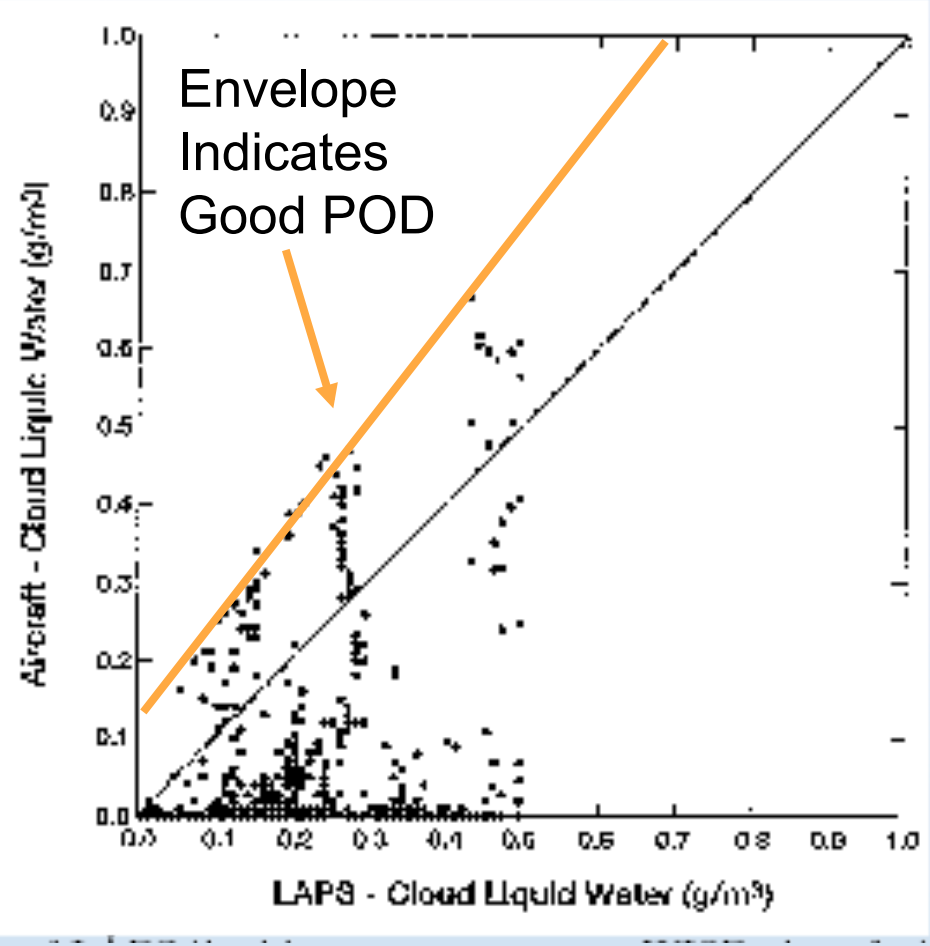


LAPS hot-start scheme
Dramatically improves
Very short-range forecast,
Importance to terminal
Scale forecasts



The hot-start scheme will be adapted into STMAS, a multi-grid variational data assimilation system with satellite, radar, conventional obs and model dynamic constraint applied simultaneously.

Analyzed Cloud Liquid vs WISP Aircraft measurements



Scatter (FAR) due to unresolved small-scale LWC variability, otherwise good analysis of icing potential

Balance Package

User-defined weights **O**

$$J = \sum_k \sum_j \sum_i O_V(\hat{u} - u')^2 + O_V(\hat{v} - v')^2 + O_\omega(\hat{\omega} - \omega_c')^2 + O_\Phi(\hat{\Phi} - \Phi')^2$$
$$+ \mu(\hat{u}_t)^2 + \mu(\hat{v}_t)^2 + \lambda(\hat{u}_x + \hat{v}_y + \hat{\omega}_p)$$
$$+ B_V\hat{u}^2 + B_V\hat{v}^2 + B_\Phi\hat{\Phi}^2 + B_\omega\hat{\omega}^2 \qquad \text{Eqn 1}$$

Hatted quantities:
solution increment

Primed quantities:
pre-balanced increment

(observations), **B** (background) are defined from known error characteristics of the first stage analysis and background model, respectively. Ideally **B** represents the actual error statistics fror the background model. Weight μ adjusts the magnitude of the residual Eularian time tendencie: of u and v relative to the other constraints and provides a balance among the mass and momentum fields. The term λ is a Lagrange multiplier that becomes another unknown. λ will ensure that continuity is satisfied to the limits of computational accuracy.

utilize background $(\,)_b$ fields so the non-linear terms become quasi-linearized with known estimates from the previous analysis step. Subscripts x, y, and p refer to horizontal (x,y) and vertical (p) derivatives.

The Eulerian time tendencies u_t and v_t given below in Eqn. 2a and b,

$$\hat{u}_t = -(u_b\hat{u}_x + \hat{u}u_{bx} + v_b\hat{u}_y + \hat{v}u_{by} + \omega_b\hat{u}_p + \hat{\omega}u_{bp}) - \hat{\Phi}_x + f\hat{v} - D(\hat{u}) \qquad \text{Eqn 2a}$$

$$\hat{v}_t = -(u_b\hat{v}_x + \hat{u}v_{bx} + v_b\hat{v}_y + \hat{v}v_{by} + \omega_b\hat{v}_p + \hat{\omega}v_{bp}) - \hat{\Phi}_y - f\hat{u} - D(\hat{v}) \qquad \text{Eqn 2b}$$

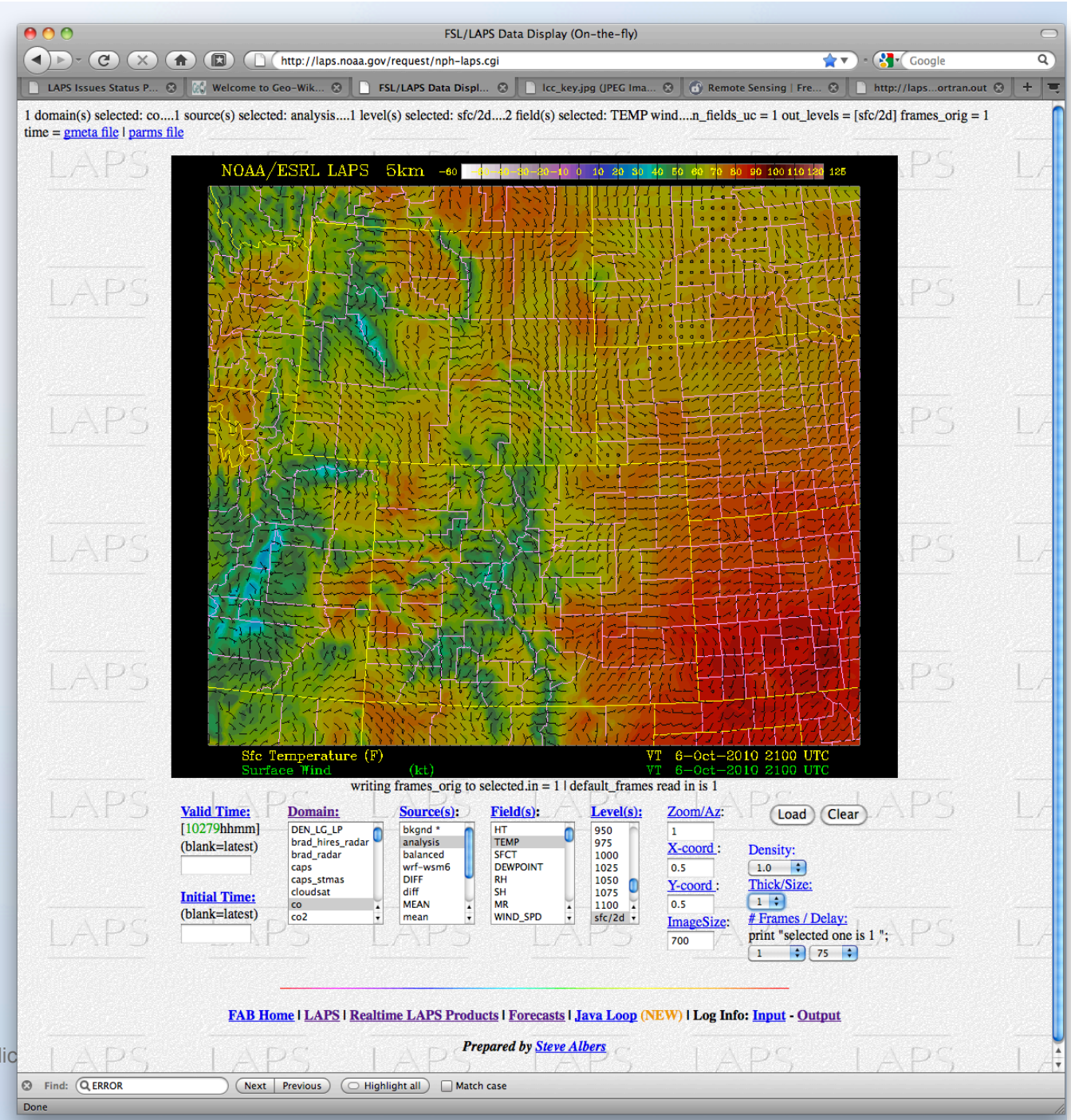
Future Cloud Analysis Development

- Higher Resolution Time/Space
- Develop forward models for all data sources being used to more fully implement a variational approach
- Incorporate methodologies into STMAS & GSI
- Consider new data sources (e.g. airborne radar)
- Improve rain gauge / radar / model first guess blending for QPE

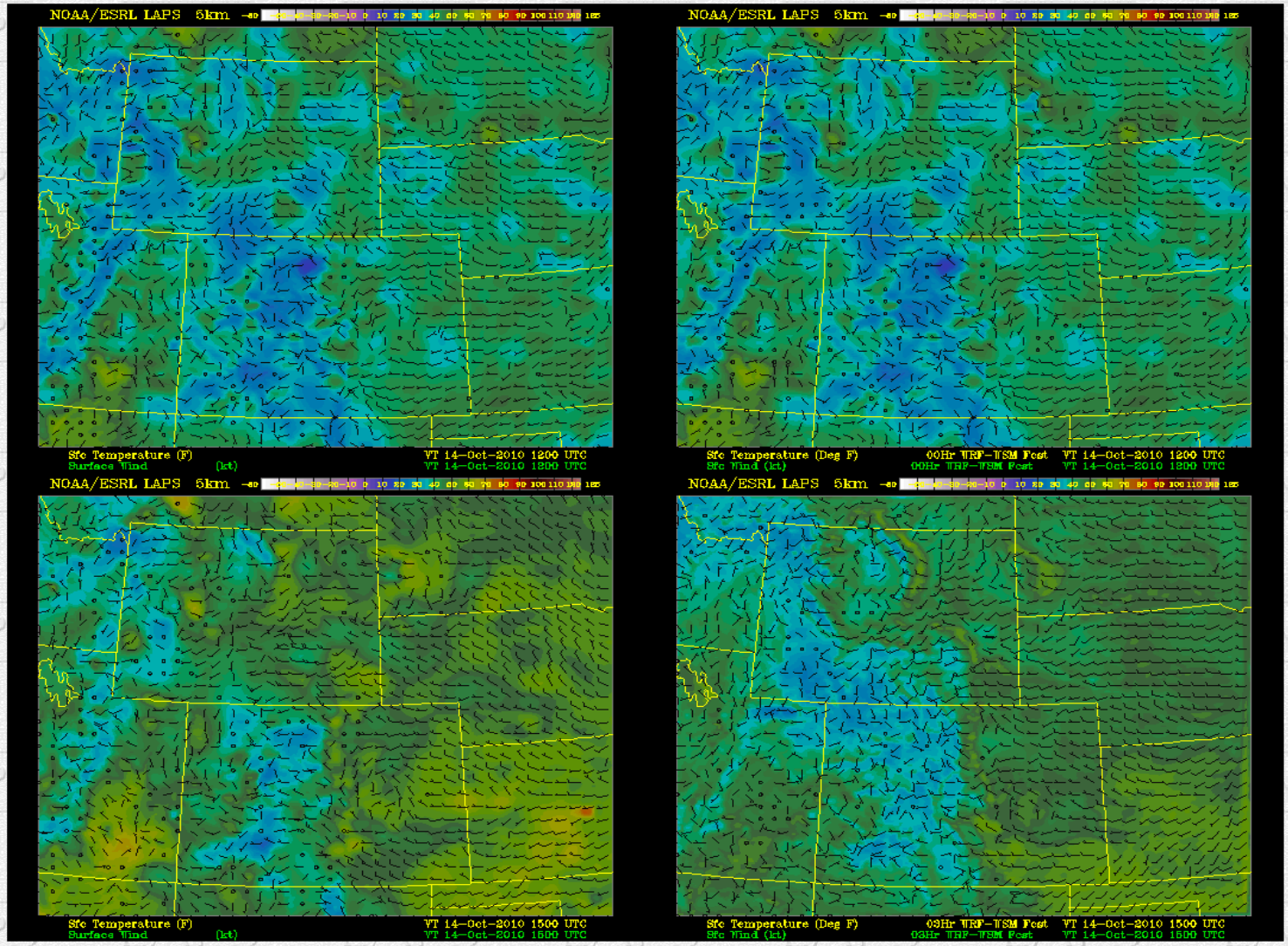
Web Products

- NCL/NCAR graphics based
- Pre-Generated NCAR graphics
  - "Sched.pl –f" runs followup_ncarg.sh to generate GIF images
- "On-the-fly" page
  - "nph-laps.cgi" script (etc/www) directory
  - Can be run on a web server
  - Publication quality imagery
  - Horizontal, vertical cross sections, soundings
  - Verify/overlay model forecasts with analyses and observations
  - Difference plots (e.g. analysis vs. first guess)
  - Animations (animated GIF / Java)
  - Montages (e.g. ensemble display through time)

"On-The-Fly" Page



“On-the-fly” Page Montage



Valid Time:
[10287hhmm]
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102871500

Initial Time:
(blank=latest)
102871200

Domain:
DEN_LG_LP
brad_hires_radar
brad_radar
caps
caps_stmas
cloudsat
co
co2

Source(s):
bkgnd *
analysis
balanced
wrf-wsm6
DIFF
diff
MEAN
mean

Field(s):
HT
TEMP
SFCT
DEWPOINT
RH
SH
MR
WIND_SPD

Level(s):
950
975
1000
1025
1050
1075
1100
sfc/2d

Zoom/Az:
1
X-coord:
0.5
Y-coord:
0.5
ImageSize:
450

Load
Clear

Density:
1.0
Thick/Size:
1
Frames / Delay: selected is auto3
auto3
75

LAPS Users Discussion Forum – LAPS General Discussion

http://laps.noaa.gov/forum/YaBB.pl?board=laps

mac screen capture

GSD Forecast Applications Bra... | FSL/LAPS Data Display (On-th... | Google Earth: Plug-in | Capture a Screen Shot with M... | GSD LAPS ROC Product Monitor | LAPS Users Discussion Forum...

Oct 8th, 2010 at 5:18pm

Forecast Applications Branch

Local Analysis and Prediction System

Discussion Forum

Good Afternoon Steve Albers,
you have 1 message, and no new messages.

Home | Help | Search | Members | Update Session | User CP | Logout | RSS

LAPS Users Discussion Forum › Local Analysis and Prediction System › LAPS General Discussion

LAPS General Discussion

Topics: 201
Posts: 478

Pages: 1 2 3 ... 11 — Start new topic | Start new poll | Notification | Mark as read

Subject	Started By	Replies	Views	Last Post
Compiling LAPS with ifort	Matt Foster	9	243	Sep 27th, 2010 at 5:35pm By: Steve Albers
Build LAPS with gfortran?	Matt Foster (Guest)	6	159	Sep 13th, 2010 at 4:21pm By: Steve Albers
Getting more S8A data	Ben Baranowski	1	52	Sep 11th, 2010 at 4:36pm By: Steve Albers
LAPS Hydrometeors from Level II radar data	Ben Baranowski	9	248	Sep 6th, 2010 at 11:18am By: Steve Albers
Compiling LapsNexrad package	Matt Foster (Guest)	1	59	Aug 27th, 2010 at 11:04am By: Steve Albers
wind.exe performance	Matt Foster (Guest)	6	145	Aug 23rd, 2010 at 12:59pm By: Steve Albers
GPS PW data	Matt Foster (Guest)	2	88	Aug 17th, 2010 at 5:25pm By: Steve Albers
LAPS Workshop Week of October 25-29	Steve Albers	0	46	Aug 10th, 2010 at 6:05pm By: Steve Albers
cloud.exe: clouds_3d	Matt Foster (Guest)	8	140	Jun 4th, 2010 at 6:18pm By: steve albers (Guest)
lga.exe: Interpolation problem	Matt Foster (Guest)	5	89	May 5th, 2010 at 11:50am By: Matt Foster (Guest)
cloud_drift ingest	Matt Foster (Guest)	2	56	May 1st, 2010 at 1:00pm By: Steve Albers (Guest)
GOES 13?	Matt Foster (Guest)	2	64	Apr 21st, 2010 at 7:36am By: dan (Guest)
Problems running lapsplot	Matt Foster (Guest)	4	60	Apr 15th, 2010 at 1:17pm By: Matt Foster (Guest)
lga.exe can't find libjasper	Matt Foster (Guest)	0	39	Mar 18th, 2010 at 9:30am By: Matt Foster (Guest)
lga.exe: Trouble reading AWIPS RUC data	Matt Foster (Guest)	7	127	Mar 17th, 2010 at 11:05am By: Matt Foster (Guest)
Error from lapsplot	Matt Foster (Guest)	1	54	Mar 17th, 2010 at 11:02am By: Matt Foster (Guest)
Compilation at CRAY machine	Erik Gregow (Guest)	0	27	Dec 21st, 2009 at 3:18am By: Erik Gregow (Guest)
Read surface information question	Maite (Guest)	2	58	Dec 18th, 2009 at 3:01am By: Maite (Guest)
lfmpost WRF	abel (Guest)	0	25	Oct 5th, 2009 at 7:01am By: abel (Guest)
Aircraft radar data ingest	Chris Chambers (Guest)	1	47	Jun 25th, 2009 at 11:59am By: steve albers (Guest)

Pages: 1 2 3 ... 11 — Start new topic | Start new poll | Notification | Mark as read

Find: ERROR | Next | Previous | Highlight all | Match case

Done

Analysis software plans

- Portability
  - Intel/ifort
  - GFORTRAN
  - Mac (Linux)
- Parallelization
  - MPI works with Traditional LAPS wind analysis
  - STMAS minimization routine is next
  - GPU technology
- Optimize & Vectorize serial code
- Sub-Kilometer resolution
  - Hi-res Terrain / Land Use (incorporated in balancing constraints)

Thanks!

- More info at:

  http://laps.noaa.gov

- Questions / Comments?